



An output from ARL s Models-3, the premier air quality model in the USA. The map shows three-dimensional wind fields derived from NCEP's Eta model for 3 July 1999. 'Jet-level' wind vectors are shown in yellow, and 3-D resolved clouds are shown in white.



The ARL instrumentation pod mounted beneath a light aircraft, and showing the Ka-band scatterometer normally used for studies of air-sea interaction and surface waves.



Instrumentation at the Desert Rock, NV, site of the ARL SURFRAD program. SURFRAD is the nation s surface radiant energy

balancebalance monitoring network. balance monitoring network.

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Air Resources Laboratory

The air as a part of our global environment

What does the Air Resources Laboratory do for the nation?

The The Air Resources Laboratory (ARL) The Air Resources Laboratory (ARL) studies pro relaterelate to air quality and climate, concentrarelate to air quality and climate, concentransfer relating to transfer relating to the transport, dispersion, transformation are gasesgases and aerosols (the exchange gases and aerosols (the exchange between the atthethe role of the role of natural variability. The time frame of interest ranges from minuthat of the global climate.

ARLARL research is aligned with the three thematic areas of NOAA ReseARL re ((weather(weather and air quality, coastal and ocean resources, and climate) we emphasesemphases on emergency preparedness, coastal ecosysteemphases on environments. A newtheme relates to technology developmentenvironme specificspecific goaspecific goal of specific goal of ARL research is to improve and prediction prediction of air quality, atmospheric dprediction of air quality, atmospher operates operates with repearch doperates with research divisions in Ida NorthNorth Carolina; Boulder, Colorado; LasNorth Carolina; Boulder, Colorado; Las Vegand Silver Spring, Maryland.

Recent Accomplishments:

- QuantifyQuantify the response oQuantify the response of the Quantify the re emissionemission rates mandaemission rates mandated emission rates mand Payoffs: Payoffs: ARLPayoffs: ARL monitoring data reveal that there is near correspondencecorrespondence between reductions in sulfur emissions and qualityquality across the eastern USA, but with somquality across the easter more than others.
- " ProvideProvide a newProvide a new generationProvide a new generation of air qua andand for exploring control options and for exploring control options. Pa Payofi the air quality community, a result of collaboration with the EPA.
- " ImproveImprove and dImprove and deploy modern high-tech systems for der exchangeexchange rates (evaporation rates and pollution deposition, for examp usingusing aircraft. Payoffs: The Best Available Payoffs: The Best Availa probeprobe is now a widely accepted tool probe is now a widely accepted studies of how the air and the surface interact.
- ProvideProvide a system for forecasting diProvide a system for forecasting disPr forecastforecast products of the National Weather Service, forecast products of the emergencyemergency managersemergency managers.
 Applications andApplications and Display SYstem (READY) is now an accep product, product, available throughproduct, available throughproduct, available throughproduct.

What s Next for ARL?

Scientific Challenges in the next five to 10 years:

- " DemonstrateDemonstrate a fully coupledDemonstrate a fully coupled meteorology and air quality modeling syste toto provideto provide guidanceto provide guidance to air quality managers, private forecasters, environmentalists atat large. The challenges are to improve uponat large. The challenges are to improve upon existing statistical and statistical methods in a routine operational system.
- " CompleteComplete an expeComplete an experimentaComplete an experimental assessment of continental gases, gases, especially carbon dioxide. This will answer questionsgases, especially carbon dioxide. This source or sink for carbon dioxide, and about the contribution of human activities.
- " DevelopDevelop and demonstrateDevelop and demonstrate an integrated atmosphere/biosphere pollution tran model, model, suitabmodel, suitablemodel, suitable formodel, suitable for model, suitable for constr compartment of it.
- " ProvideProvide routine information onProvide routine information on the surface boundary condition for the new weatherweather forecasting models—the Weather Research and Fore expansion of the ARL Surface Radiation (SURFRAD) program, and coupling expansion programs such as Ameriflux (in which ARL is also a major player).

CompleteComplete an aComplete an assComplete an assessment of atmospheric mercury and other toxic

- attention to high latitudes and other sensitive ecosystems.
- "Improve and implement a forecasting system for smoke and haze, for the continental USA.

Research Partnerships:

ARLARL is in partnership with many universities and ARL is in partnership with many universities and universit University Corporation for Atmospheric Research, OakUniversity Corporation for Atmospheric Research, Oak Ridg NOAANOAA Cooperative/Joint Institutes. ARL is also in partnership with other federal agencies, including NOAA CEPA and the Department of Defense.

- " TheThe CooperativeThe Cooperative Institute for AtmosphericThe Cooperative Institute for Atmospheric Scie inin Las Vegas and Reno, Nevada, is a NOAAin Las Vegas and Reno, Nevada, is a NOAA cooperative institute (DRI) of the University and Community College System of Nevada (UCCSN).
- TheThe Cooperative Institute for ResThe Cooperative Institute for Research in theThe Cooperative Institute cooperative institute between NOAA and Colorado State University.
- " TheThe Cooperative Institute forThe Cooperative Institute for Research in Environmental Sciences (CIRES) lo is a cooperative institute between NOAA and the University of Colorado.

Budget and Staff:

ARLARL is a \$17.2 million laboratory (\$3.3 million in NOAA base), v 14 university, and 22 contract employees.

For more information, contact:

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